

State of California — The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**PRIMARY RECORD**

Primary # \_\_\_\_\_  
HRI # \_\_\_\_\_  
Trinomial \_\_\_\_\_  
NRHP Status Code \_\_\_\_\_

Other Listings \_\_\_\_\_  
Review Code \_\_\_\_\_ Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Page 1 of 4 Resource name(s) or number (assigned by recorder) N-229

**P1. Other Identifier:** Experimental Fluid Dynamics Facility/Space Technology Division, 3.5' Hypersonic Wind Tunnel

**\*P2. Location:** ☒ Not for Publication ☐ Unrestricted

**\*a. County** Santa Clara

**\*b. USGS 7.5' Quad** San Francisco North, Calif. **Date:** 1995

**\*c. Address** 300 Boyd Road

**City** Moffett Field

**Zip** 94035

**\*e. Other Locational Data:**

**\*P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

Building N-229 is composed of two buildings: a two-story corrugated metal warehouse and a two-story concrete office/laboratory. Both buildings have steel frame structural systems with concrete foundations and flat roofs. The office portion features a scored concrete façade and fenestration composed of three-panel aluminum sash windows with operable awning-sash lower panels. On the first and second floor, above these windows are concrete canopies. The entry into the building is located along the south façade and is demarcated by roman brick exterior cladding and a set of glazed double doors with sidelights. The upper portion of the building is clad with vertical corrugated metal siding. At the northeast corner is a small shed addition. The north façade is connected to four large orbular tanks, which occupy the southeast corner of the intersection of Hunsaker Road and DeFrance Avenue. It is 23,940 sq. ft. The building serves as a hypersonic window tunnel facility and as an electric air shock tube.

For technical description, see Continuation Sheets. Also refer to DPR 523 Form A for Building N-229A.

This building appears to be in good condition.

**\*P3b. Resource Attributes:** (list attributes and codes) HP39 – Other: Wind Tunnel

**\*P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other

P5a. Photo



**P5b. Photo:** (view and date)  
View of East Façade (8/11/05)

**\*P6. Date Constructed/Age and Sources:** 1961

**\*P7. Owner and Address:**  
United States of America as  
represented by National Aeronautics  
and Space Administration (NASA)

**\*P8. Recorded by:**  
Page & Turnbull, Inc.  
724 Pine Street  
San Francisco, CA 94108

**\*P9. Date Recorded:** 08/04/05

**\*P10. Survey Type:**  
Reconnaissance

**\*P11. Report Citation:** National  
Aeronautics and Space  
Administration, *Technical Facilities  
Catalog*, Volume 1, publication  
NHB 8800.5A (1), October 1974;  
Technical Information Division,  
Ames Research Center, Ames

*Research Facilities Summary*, 1974; Donald D. Baals and William R. Corliss, *Wind Tunnels of NASA*, NASA SP-440, 1981.

**\*Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☐ Building, Structure, and Object Record  
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record  
☐ Artifact Record ☐ Photograph Record ☐ Other (list)

State of California — The Resources Agency  
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**CONTINUATION SHEET**

Primary # \_\_\_\_\_

HRI # \_\_\_\_\_

Trinomial \_\_\_\_\_

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Resource Name or # N-229

\*Recorded by Richard Sucré, Page & Turnbull

\*Date 04/07/06

☒ Continuation   ☐ Update

## **1. THREE AND ONE/HALF-FOOT HYPERSONIC WIND TUNNEL**

### **DESCRIPTION:**

The Three and One-Half-Foot Hypersonic Wind Tunnel is a closed circuit, blow-down, wind tunnel, utilizing interchangeable contoured axisymmetric nozzles. Heat is supplied to the test gas by a storage heater containing aluminum oxide pebbles which are heated by burning natural gas during the recycle period. Usable test time, dependent upon test conditions, varies from 1/2 to 3 minutes, and the time between test runs averages 1-1/2 hours. The test region is of the open jet type. The test chamber is a cylinder 12 feet in diameter and 48 feet in length, with the axis normal to the flow direction. The effective test section core is an open jet 3.5 feet in diameter and approximately 10 feet in length. A model support inserts and retracts models from the test stream and has a remotely actuated angle of attack range from -20 to +20 degrees. Shadowgraph and cameras are contained within the test chamber. Data are normally recorded in digital form on magnetic tape at a rate of 2500 samples per second.

### **PERFORMANCE:**

Mach numbers	5, 7, 10 and 14
Reynolds number	$0.3 \times 10^6$ to $7.4 \times 10^6/\text{ft}$
Dynamic pressure	1,600 psf, maximum
Stagnation pressure	122 atmospheres, maximum
Stagnation temperature	3,460° R, maximum

### **DIMENSIONS: Test Section (Core)**

Length	10 feet
Diameter	3.5 feet

### **STATUS:**

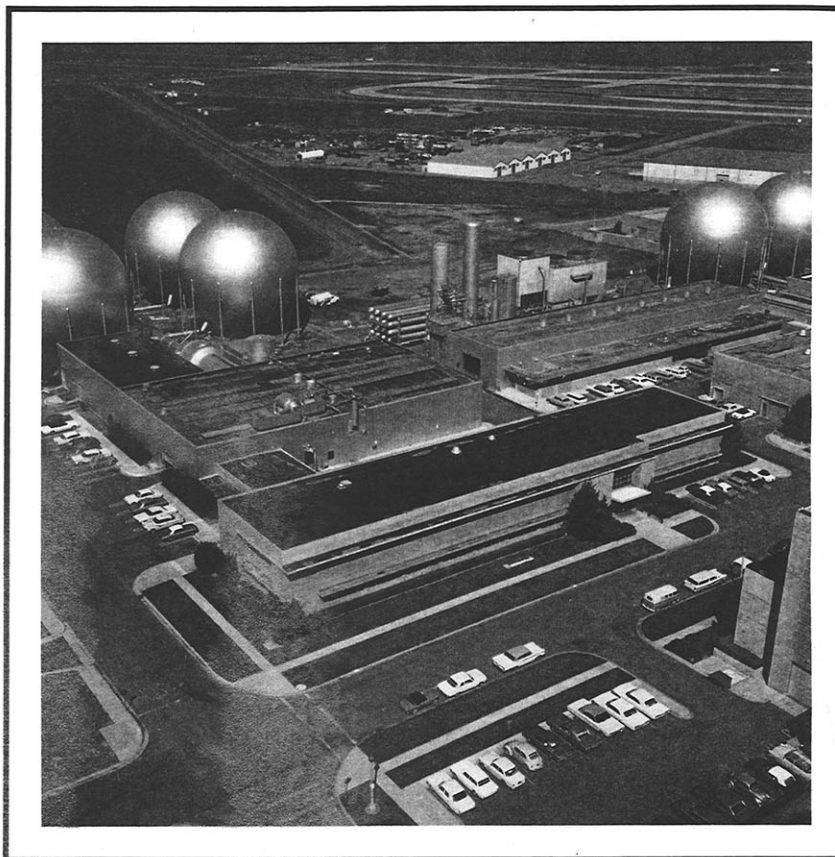
Operational since 1961, refurbished in 1972.

### **JURISDICTION:**

Thermo-and Gas-Dynamics Division  
Experimental Fluid Dynamics Branch  
Joseph G. Marvin

### **LOCATION:**

Building N-229



## 2. ELECTRIC ARC SHOCK TUBE

### DESCRIPTION:

The Electric Arc Shock Tube Facility is used for investigations such as gas laser development, radiation and ionization studies for outer planetary entries, chemical reaction rate measurements, and diagnostics in high-energy flows requiring a high-performance electric arc driven shock tube facility. Shock velocities of 30 to 40 km/sec. can be attained with quick succession operation (3-5 tests per day) utilizing the conical arc chamber. Energy for the driver is supplied by a one-megajoule capacitor storage system. It can be charged to a preset energy at either a 0 to 40 kV mode (1,250  $\mu$ f) or a 0 to 20 kV mode (5,000  $\mu$ f). The unique capability to change circuit capacitance for a particular energy storage permits control of the current pulse width (time constant) of the arc discharge.

### DIMENSIONS:

Length 40 ft.  
Diameter 4 inches

### STATUS:

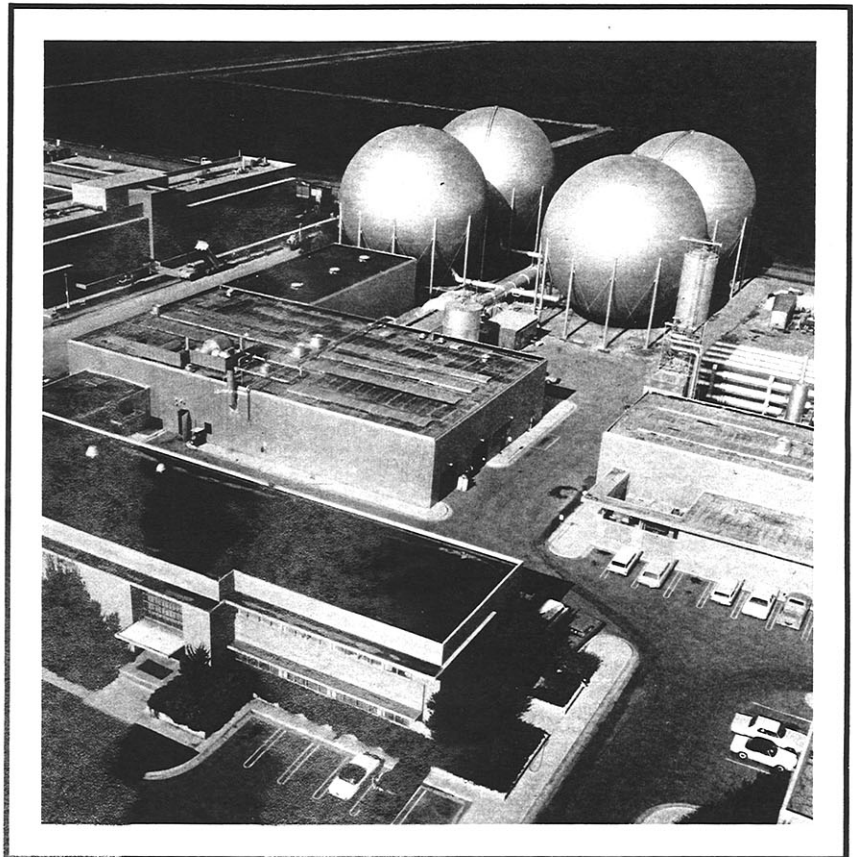
Operational since 1966

### JURISDICTION:

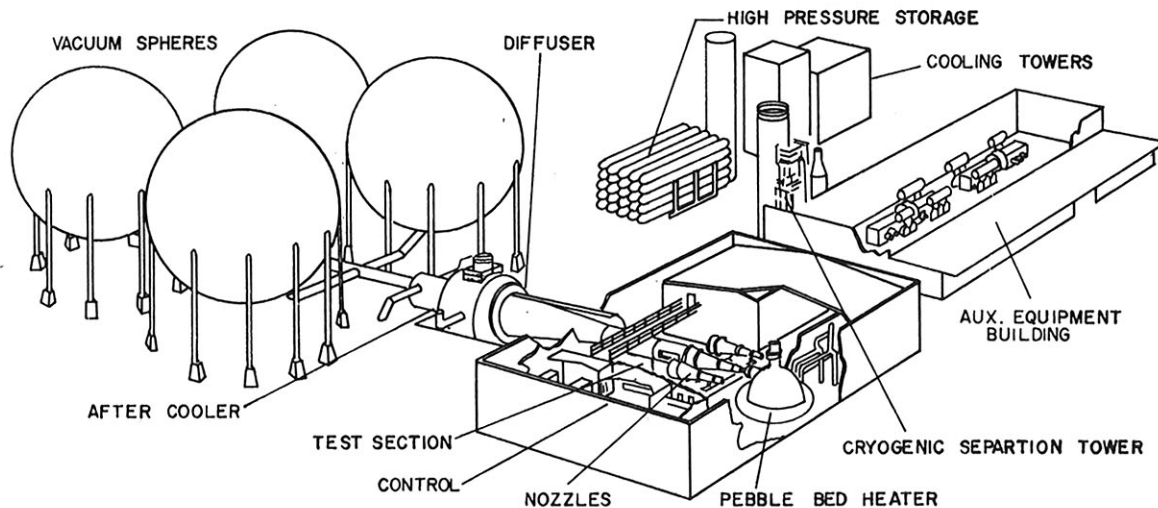
Thermo-and Gas Dynamics Division  
Physical Gas Dynamics and Lasers Branch  
C. Frederick Hansen

### LOCATION:

Building N-229



N 229



#### DESCRIPTION

The 3.5-ft hypersonic wind tunnel is a blowdown-type facility having 4 contoured, axisymmetric nozzles utilizing air film cooling to control wall temperature. The test section is 3.5 ft in diameter, open, and can accommodate models up to 24 in. in span, 40 in. in length, and 10 in. in diameter. The model support system includes a sting support and a method for quick insertion of the models into the stream. Data recording is a magnetic tape at rates to 2500 samples per sec. A storage heater utilizing alumina pebbles produces the temperature. The recycle time is nominally one hour.

#### CHARACTERISTICS

Dynamic Pressure, psf:	to 1600
Mach Number:	5, 7, 10, 14
Reynolds Number, per ft:	$0.1 \times 10^6$ to $6.9 \times 10^6$
Stagnation Pressure, atm:	to 122
Stagnation Temperature:	to 3460°R
Test Times:	1 to 4 minutes